

A WASTE MANAGEMENT METHOD AND SYSTEM

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Related Applications

The present application claims priority from pending provisional application 60/219,533, filed July 20, 2000, entitled "Waste Management System".

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Field Of The Invention

The present invention relates generally to a method and system for managing and monitoring transportation activity, and more particularly to a method and system for verifying credentials of and recording transactions involving haulers, their drivers and trailers, hired to transport waste between various remote sites, to ensure compliance with state regulatory and individual contract requirements.

Background Of The Invention

Currently no method or system is available to a transportation management entity, responsible for material deliveries to and from remote sites, to verify credentials of haulers (transport organizations) hired to transport the materials, in real time, and record hauler transactions to and from the remote sites. Without a system to verify, at the time of pickup and delivery, the credentials of drivers, haulers and trailers, and record the date/time and material weight of pickup and deliveries, the transportation management entity cannot prevent, before the fact, the use of unqualified drivers, the delivery of overweight or incorrect loads, delivery to incorrect destinations and deliveries using improper routes.

The transportation management entity is often liable for costs resulting from
improper deliveries, hauler accidents and vehicle violations, even if the hauler is an
independent, third-party subcontractor. In addition, the transportation management entity
suffers from poor public relations and loss of goodwill when negligent haulers are involved
5 in accidents and/or incur fines due to regulatory violations.

The above-noted costs are especially excessive when the material transported
is waste. Hauler accidents often involve environmental clean-up costs and legal costs and
vehicle violations are high due to the sensitive and specifically regulated nature of waste
transportation and disposal. Furthermore, pending legislation in various states intends to
10 prevent or severely restrict the transportation and/or disposal of waste over certain state
lines.

For the foregoing reasons, there is a need for a method and system to verify
the credentials of and monitor transactions involving haulers, at the time of material pickup
and delivery, for management and control of hauler activity to ensure compliance with
15 contract and state regulatory requirements, and minimize liability associated with hauler
accidents and violations.

Summary of the Invention

The present invention is a method and system to verify, record and monitor
pertinent data involving haulers, their drivers, vehicles and trailers, hired to transport
20 materials between various site locations. The present invention ensures hauler and driver
compliance with hauler contract and state regulatory requirements by controlling site
access, the present invention denying site access to those without valid credentials and
refusing delivery from those with improper loads.

In one aspect of the present invention, a transportation management system is provided which includes a site controller located at each remote site. The site controller is used to authorize site access. The system further includes a central controller located at a central management location which communicates with each site controller. The central controller transmits operating information and site access authorization data to each site controller. Site access is provided to transporting entities through use of an identification device that interacts with the site controllers at each remote site. The identification device retains identification information about the transporting entity which is verified by the respective site controller using the operating information and site access authorization data communicated to each site controller. Upon verification of pre-determined credentials, a respective site controller authorizes site access.

In another aspect of the present invention, the transportation management system also records transaction data involving the transporting entities at each remote site. Site transaction data is recorded to a respective site controller, which periodically transmits the site transaction data to the central controller. The site controllers could also write the transaction data to the identification device of the transporting entity. The central controller generates statistics based on the transaction data for use by managing personnel.

In a further aspect of the present invention, a method for controlling access to sites (for control of a pick-up and delivery trip) of a transportation network is provided. Access is controlled by verifying pre-determined characteristics of a transporting entity at a first remote site, where a positive verification provides the transporting entity access to the first remote site. Transactions occurring at the first remote site are then recorded. At a second remote site pre-determined characteristics of the transporting entity are again verified along with pre-determined data from the transaction occurring at the first remote

site. A positive verification provides the transporting entity access to the second remote site for delivery of materials loaded at the first remote site.

In a still further aspect of the present invention, the above method is further used to manage and monitor a transportation network by adding the steps of recording pre-
5 determined second remote site transaction data and then evaluating the first remote site transaction data with the second remote site transaction data to create statistics, and generate reports, used to manage and monitor the transportation network.

In yet another aspect of the present invention, the methods and systems above are directed to transporting waste, where the first remote site is a transfer station and the second remote site is a landfill. The transportation network could include hundreds, or thousands, of remote sites (transfer stations and landfills) separated by hundreds, or thousands, of miles. The transporting entity could be a third-party, subcontract hauler represented by a driver having a vehicle with trailer. The transporting entity could also be a direct employee or some other independent person or entity. The identification device could be an identification card with read/write memory chip.

It is therefore one object of the present invention to track and verify the credentials of contracted third-party waste haulers, their driver's, vehicles and trailers, thereby controlling hauler access to transfer stations and landfills.

It is another object of the present invention to that ensure that trailer weights
20 are in compliance with regulatory requirements and that the trailer weight leaving a transfer station equals that arriving at a landfill (at least within an allowable differential).

It is a further object of the present invention to ensure that trailers of material leaving a transfer station arrive at their assigned landfill and that no trailer is accepted at a landfill unless previously assigned to that landfill.

It is a still further object of the present invention to electronically record information regarding, and transactions involving, organizations (haulers), their drivers, vehicles and trailers, hired to transport waste from transfer stations to landfills, to generate data assisting in the management of a waste transporting network.

5 **Brief Description Of The Drawings**

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

10 Figure 1 illustrates by flow diagram a transfer station (TS) inbound verification and transaction process undertaken by a driver, representing a hauler, hired to transport waste from a transfer station to an assigned landfill, in accordance with the present invention;

15 Figure 2 illustrates by flow diagram a transfer station (TS) outbound verification and transaction process undertaken by a driver, representing a hauler, hired to transport material from the transfer station to an assigned landfill, in accordance with the present invention; and

Figure 3 illustrates by flow diagram a landfill (LF) inbound verification and transaction process undertaken by a driver, representing a hauler, hired to transport material from a transfer station to the landfill, in accordance with the present invention.

20 **Detailed Description Of The Invention**

The present invention is a method and system for use by a transportation management entity to enforce contract and regulatory compliance by transporting entities hired to transport goods between remote site locations. The present invention also records and monitors (through report generation) transporting entity transactions occurring at the

remote site locations to track delivery timeliness and adequacy. Generally, a transporting entity is defined as any one (or all) of a hauling organization, a driver, vehicle or trailer.

While the method and system of the present invention is applicable to any transportation management entity coordinating a point to point network of material pick-up and deliveries, the detailed description of the invention is directed to a waste management organization operating a network of transfer stations "TS" (first remote site locations) and landfills "LF" (second remote site locations). Waste is the material transported and the transporting entities are independent, third-party haulers contracted to transport waste from certain transfer stations to certain landfills. It is understood that the haulers and/or drivers could be employees of the transportation management entity, or representatives of some other, independent contracting organization.

System Components

Waste Management Unit (WMU) – Site Controller

The waste management unit (WMU) is a scale house mounted microprocessor based trip accounting and site access controller (site controller) that accumulates transaction data and controls site access. The WMU could be a personal computer, or a microprocessor based device interfacing with a computer existing at the remote site location (such as a computerized weigh scale system).

In one embodiment of a WMU interfacing with weigh scale hardware and software, the WMU includes a control panel having a liquid crystal display (LCD) that is 20 2 lines by 40 characters, a numeric keypad (0 through 9, A through D, Enter/Yes, and Clear/No), and a identification card (IDcard) receptacle. It is through the control panel that the IDcard gains access to the WMU.

Identification Card (IDcard)

The IDcard is the WMU's unique access device provided to initiate a transaction at the WMU. All IDcards are constructed alike with a read/write memory chip housed in a durable plastic card. Ancillary equipment and software could be included to print pictures (photo identifications) and organizational logos on the IDcards.

5 IDcards are encoded as a driver card or a site manager card. A driver card is assigned to each driver (hauler representative) for verification (site access authorization) and transaction recording purposes during remote site visits. A site manager card is assigned to remote site managers to override certain verification and transaction requirements, change system functions and assist with WMU diagnostics.

10 Generally, a driver card has two categories of information:

1. Encoded data (via Central Controller at a central management location) – Driver ID, Name, Employer Organization (hauler), date of commercial driver's license (CDL) expiration, date of motor vehicle report (MVR) expiration date, physical (medical exam) expiration, etc. See driver database, below. Generally, the expiration date of the IDcard is the date of the first credential (CDL, MVR, physical) to expire.
2. Updateable data (via WMU by site representative or site manager) – Trailer ID, Gross Vehicle Weight, destination ID, etc. See transfer station outbound transaction data, below.

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Scale House

The scale house is a typical location, within the first remote site location (transfer station) and the second remote site location (landfill), where the operator interface for the weigh scales is located. At this location, the scale operator has access to the WMU,

and to the computer system directly interfacing the weigh scales and WMU (if this is the chosen design).

A computerized scale operation is not required to implement the method and system of the present invention. Since many remote site locations have computerized scale operations for record-keeping purposes, the method and system of the present invention is 5 designed to electronically communicate with the databases included in the scale system designed to electronically communicate with the databases included in the scale system software.

Scales & Scale Software

The WMU has a serial interface port and internal firmware written to communicate with software operating the weigh scales at each remote site.

Central Controller

The central controller can be an IBM-compatible personal computer (PC) with a hard drive, monitor, keyboard, modem (internal or external), and parallel printer. The central controller is located at a central accounting or a central management location. The central controller communicates with the WMU(s) at sites via a modem. The central controller receives transaction data from the WMU(s) and is used to input (upload) 15 operating information and access authorization data to each WMU.

One central management location could exist for an entire (nationwide) transportation network, or central management locations could be regionalized. In one 20 embodiment of the present invention, one regional central management location covers 11 states, includes 250 transfer stations and 30 landfills, using 3500 trailers.

IDcard Encoder

The IDcard encoder writes data to, and reads data from, the memory chip of the IDcard. The IDcard encoder connects directly to an open parallel printer port in the

central controller and is controlled by the central controller software. Due to variances in the DC output driver voltages from different computer systems, the IDcard encoder is supplied with a DC power supply, ensuring a constant power source and compatibility with any selected computer system. When used in conjunction with the central controller and 5 central controller software, the IDcard encoder encodes/revises IDcards with owner-selected confidential access codes to assure complete security against unauthorized system access and to permit accurate recording of site transactions to the IDcard by the WMU (site controller).

Central Controller Software-Trip Management Software

When loaded in a personal computer, the trip management software provides an operating program for data and reporting control by the WMU(s). The central controller communicates with the WMU to download transaction data, upload authorizations, or to change WMU configuration. The trip management software provided with the system can be designed for modem communications through voice-grade telephone lines.

System Information

The waste management method and system (trip management system) electronically stores and verifies pertinent data regarding haulers (transporting entities), 20 their drivers, vehicles and trailers, hired to transport waste between various transfer stations and landfill sites.

A driver transporting waste between a transfer station and a landfill is required to stop their vehicle on a weigh scale and present their IDcard to a scale operator (or other owner's representative) upon entering and exiting all transfer stations (first remote

site location) and upon entering all landfill sites (second remote site location). At each remote site location, driver, hauler and trailer qualifications are verified.

Transfer Station (TS) Inbound Verification

The transfer station inbound verification: If the hauler's contract, or the driver's insurance, commercial driver's license, or physical examination clearance has expired, or the driver's IDcard has been placed on "lockout" status, the driver, vehicle and load will be denied access to the transfer station.

Transfer Station (TS) Outbound Verification

The transfer station outbound verification: In addition to repeating the transfer station inbound verification, the vehicle is weighed, the trailer number verified (trailer registration and inspection current) and a destination site assigned. Vehicles exceeding regulatory weight limitations, or trailers placed on "lockout" status, will not be permitted to proceed.

Landfill (LF) Inbound Verification

The landfill site inbound verification: In addition to repeating the transfer station inbound verification, the vehicle is weighed, the trailer number verified (same trailer as that leaving transfer station) and the assigned destination site compared with the actual landfill site. Vehicles gaining over a pre-determined weight differential (e.g., 2500 lbs. is an appropriate differential allowing for water weight gain from rain during transport) will not be permitted to proceed. Vehicles arriving at an incorrect destination (landfill), drivers who have switched trailers or drivers delivering trailers placed on "lockout" status, will not be permitted to proceed (deliver).

Transfer Station (TS) Inbound Transaction Data

Site transaction data is created and recorded at each remote site location.

The transfer station inbound transaction data recorded into the WMU consists of:

- 5 1. Driver SSN (social security number) [9-digit numeric]
2. Date/time [--/--/----]
3. Trailer ID [8-digit numeric]
4. Transfer station [6-digit numeric]
5. Transaction type [2-digit numeric]
6. Trip ID

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Transfer Station (TS) Outbound Transaction Data

The transfer station outbound transaction data recorded into the WMU consists of:

- 15 1. Driver SSN [9-digit numeric]
2. Date/time [--/--/----]
3. Gross Vehicle Weight [6-digit numeric]
4. Tare Weight
- 20 5. Net Weight
6. Trailer ID [8-digit numeric]
7. Transfer station [6-digit numeric]
8. Destination (landfill) ID [6-digit numeric]
9. Transaction type [2-digit numeric]
- 25 10. Trip ID

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In addition to recording the transfer station outbound transaction data into the WMU for downloading to the central controller, the transfer station outbound transaction data is written to the driver's IDcard (driver card) for presentation by the driver during the landfill site inbound verification process.

Landfill (LF) Inbound Transaction Data

The landfill inbound transaction data recorded into the WMU consists of:

- 35 1. Driver SSN [9-digit numeric]
2. Date/time [--/--/----]
3. Gross Vehicle Weight [6-digit numeric]
4. Trailer ID [8-digit numeric]
5. Transfer station [6-digit numeric]
6. Destination (landfill) ID [6-digit numeric]
- 40 7. Transaction type [2-digit numeric]

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8. Trip ID

Central Controller Database Information

5 Database information necessary for system operation includes a driver database, hauler database, trailer database, site database and site manager database. The database information is recorded at the central controller and uploaded to respective WMUs at remote site locations (transfer stations and landfills).

Driver Database

10 The driver database includes the following information:

1. Driver name (Last, First, MI) [40-digit, alphanumeric]
2. Driver ID [11-digit alphanumeric]
3. Driver Social Security Number [9-digit numeric]
4. Hauler ID [5-digit numeric]
5. Driver's License (CDL) number [40-digit, alphanumeric]
6. Driver's License (CDL) expiration date [--/--/----]
7. Motor Vehicle Report Expiration Date [--/--/----]
8. Physical Expiration date [--/--/----]
9. Issue Date of IDcard [--/--/----]
10. IDcard Activation Date [--/--/----]
11. Photo ID Image file name
12. Authorized Flag
13. Status: active or inactive [1-digit numeric]

25 **Hauler Database**

The hauler database includes the following information:

1. Hauler ID [5-digit numeric] (2-digit state code, 3-digit company code)
2. Name of organization [40-digit, alphanumeric]
3. Street Address [40-digit, alphanumeric]
4. City [40-digit, alphanumeric]
5. State [2-digit, alphanumeric]
6. Zip [20-digit, numeric]
7. Telephone Number (primary) [14-digit, alphanumeric]
8. Telephone Number (secondary)[14-digit, alphanumeric]
9. Telephone Number (Fax)[14-digit, alphanumeric]
10. Hauler Contact Person [60-digit, alphanumeric]
11. Email address [40-digit, alphanumeric]
12. Contract Start Date [--/--/----]
13. Contract End Date [--/--/----]
14. Status: active or inactive [1-digit numeric]

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- 15. DOT (Dept. of Transportation) rating: Satisfactory, Unsatisfactory or Conditional [1-digit numeric]
- 16. DOT ID [14-digit, alphanumeric]
- 17. Insurance Company name [60-digit, alphanumeric]
- 18. Insurance Policy Number [60-digit, alphanumeric]
- 19. Insurance Company phone number [14-digit, alphanumeric]
- 20. Insurance Expiration Date [--/---/---]

Trailer Database

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The trailer database includes the below information for each trailer. A table (listing) of trailers provides each WMU with a look-up table to verify that a trailer ID, entered by keypad entry at the remote site, is valid. Although all of the following data could be uploaded to the WMUs, only the trailer ID and trailer tag expiration date information is routinely uploaded to the WMUs.

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- 1. Trailer ID [11-digit numeric] {2-digit State code, 3-digit company code, & 6-digit trailer number}
- 2. Hauler ID [5-digit numeric]
- 3. Miscellaneous field [15-digit alphanumeric]
- 4. Trailer tag expiration date [--/---/---]
- 5. In-Service/Out-of-Service Flag
- 6. Authorized Flag

Site Database

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The site database includes the below information for each site (transfer stations and landfills). A table (listing) of all sites provides each WMU with a look-up table to verify that a site ID, entered by keypad, is valid. Although all of the following data could be uploaded to the WMUs, only the site ID and site type information is routinely uploaded to the WMUs.

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- 1. Site ID [8-digit numeric] {4-digit district ID, 2-digit site location number & 2-digit WMU number}
- 2. Site type [1-digit numeric]
- 3. Site Contact [40-digit alphanumeric]
- 4. Site Telephone number (primary)[14-digit, alphanumeric]
- 5. Site Telephone number (secondary)[14-digit, alphanumeric]
- 6. WMU Telephone number [14-digit, alphanumeric]
- 7. Fax number [14-digit, alphanumeric]

8. Responsible Organization (Company identifier) [40-digit alphanumeric]

Site Manager Database

The site manager database includes the below information for each site manager. A table (listing) of site managers provides each WMU with a look-up table to verify that a site manager ID, entered by keypad entry at a remote site, is valid. Although all of the following data could be uploaded to the WMUs, only the site manager IDs are routinely uploaded to the WMUs.

1. Site Manager ID (SSN) [9-digit numeric]
2. Manager Name (Last, First, MI) [40-digit, alphanumeric]
3. Street Address [40-digit, alphanumeric]
4. City [40-digit, alphanumeric]
5. State [2-digit, alphanumeric]
6. Zip [20-digit, numeric]
7. Telephone Number (primary) [14-digit, alphanumeric]
8. Telephone Number (secondary) [14-digit, alphanumeric]
9. Telephone Number (Fax) [14-digit, alphanumeric]
10. Email address [40-digit, alphanumeric]
11. Authorized Flag

Central Controller Driver Card Encoding

The driver card (IDcard) includes a read/write memory chip capable of retaining at least the following data:

1. Driver social security number [9-digit numeric]
2. Commercial driver's license (CDL) number [40-digit, alphanumeric]
3. Motor vehicle report (MVR) expiration date [--/---/---]
4. Commercial driver's license (CDL) expiration date [--/---/---]
5. Physical expiration date [--/---/---]
6. *Earliest* expiration date *between* Physical, MVR or CDL [--/---/---]
7. Hauler ID [5-digit numeric]
8. IDcard activation date [--/---/---]
9. Space for WMU to write destination landfill ID [6-digit numeric]
10. Space for WMU to write gross total weight (GTW) [6-digit numeric]
11. Space for WMU to write trailer ID [8-digit numeric]
12. Space for WMU to write transfer station ID [6-digit numeric]
13. Space for WMU to write transfer station time stamp [10-digit numeric]

Items 1-8, above, are encoded by the central controller. Only the central encoder is capable of revising this data. Items 9-13 are written to the (at transfer station) and cleared from the card (at landfill) by a respective WMU.

Central Controller Site Manager Card Encoding

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The site manager card includes a read/write memory chip capable of retaining at least the following data, providing site managers with authority to perform the following:

1. Trailer ID override (TS outbound & LF Inbound)
2. Manual entry of weights (TS outbound & LF Inbound)
3. Destination landfill override [6-digit numeric] (LF Inbound)
4. Differential (2500 lbs) weight increase override (LF Inbound)
5. Diagnostics of WMU components
6. System (change message duration and timeouts, etc.)

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Trip Management Software

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The trip management software of the central controller enables management personnel at the central management location to monitor the following criteria, and upload the following to each WMU for authorization use during the site verification (site access approval) process:

- Hauler has signed contract in place
- Hauler has certificate of insurance in place
- Driver has valid driver's license
- Driver has an acceptable DOT record
- Driver has an acceptable Medical record
- Trailer has valid inspection and license

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The trip management software is capable of deleting criteria from, or adding criteria to, the databases listed above, for monitoring or verification purposes.

30 Reports

The trip management software is capable of providing flexible, user defined reporting of credential expirations for the haulers, drivers and trailers. The software can

generate hard copy notification of upcoming expirations, or upcoming expirations can be uploaded to WMUs for notification during the next site by the subject hauler, driver or trailer. For example, during a transfer site inbound verification, a WMU will notify a driver that one of his credentials (or a credential of his employer (hauler)) is due to expire within a specific period of time. Of course, if a credential of the driver (or respective hauler) has expired, the driver will be notified, and perhaps denied site access.

The trip management software periodically downloads transaction data from the WMUs (usually twice a day) and is capable of generating a variety of reports.

Examples are:

1. An Exception Report including lists of one or more of the following:
 - a. All uncompleted trips since the last transaction download (i.e., each transfer station outbound transaction without a inbound landfill transaction for the same driver);
 - b. Site authorizations by a site manager (not assigned on driver card);
 - c. All uncompleted trips from earlier transaction downloads;
 - d. Trips with trailer weight gains exceeding pre-determined limits (excessive differentials), and whether site manager override occurred.
2. A Transaction Report (of hauler and/or driver), grouping three transactions:
 - a. Transfer Station – Inbound
 - b. Transfer Station - Outbound
 - c. Landfill Site – InboundTransfer Station – Outbound and Landfill – Inbound are compared, showing start and finish (date/time) for an assigned waste haul route.
3. A Hauler Activity Report (each set of transactions by hauler, with weight), showing total weight by organization, and total weight by organization to a particular landfill, for a given period. These reports can be used by accounts payable departments.
4. A Trip Report (listing completed trips and grouping by particular trips) including: hauler, transfer station, landfill and weights.
5. Period Reports - Within any user definable period, data groupings by site, driver, trailer and hauler.
6. System Database reports – for any database included in the system (driver report, hauler report, etc.), providing current lists of all drivers, haulers, trailers, site managers, etc.

Method of Operation

Transfer Station (TS) Inbound Procedure

The transfer station inbound verification and transaction process undertaken

5 by a respective driver is detailed by flow diagram in Figure 1, and summarized below:

- Driver arrives at Transfer Station: Once directed, proceeds onto the scales. The driver presents the scale operator or site manager with his/her IDcard.
- After verifying the driver's picture, the scale operator inserts the IDcard into the WMU (site controller).
- The WMU reads the IDcard and determines whether the driver and hauler are in compliance with the pre-determined characteristics required by the Transportation Management entity.
- If "compliant", the WMU prompts the scale operator to enter whether the vehicle is "inbound" or "outbound".
- Upon entering "inbound", the WMU prompts the scale operator to enter the trailer ID. The WMU validates trailer compliance. If compliant, the scale operator writes the trailer ID to the IDcard, retains the driver's IDcard, and informs the driver to proceed to the loading area.
- Once the trailer is loaded, the driver returns with the load to the transfer station outbound scale.

Transfer Station (TS) Outbound Procedure

The transfer station outbound verification and transaction process undertaken

30 by a respective driver is detailed by flow diagram in Figure 2, and summarized below:

- Once the trailer is loaded, the driver returns with the load to the transfer station outbound scale to weigh out.
- The driver's IDcard is again entered into the WMU.
- If hauler/driver is found compliant, the WMU prompts the scale operator to enter whether the driver is "inbound" or "outbound".
- Upon entering "outbound", the "inbound" transaction ends and the scale operator proceeds with the weighing process and entry of data to scale equipment and software (or directly to the WMU if the scale equipment is not computerized).

➤ If data is entered to scale software, the scale software transmits the data to the WMU. Data includes trailer ID, destination ID, gross, net and tare weights.

➤ WMU verifies IDcard data, weight, destination ID and trailer ID.

5 ➤ WMU writes weight, destination ID and trailer ID to driver's IDcard.

10 ➤ Scale software creates a weigh ticket and the IDcard is returned to driver. The driver proceeds to the assigned destination.

15 ➤ If, at any time during the verification and transaction process, the transaction is terminated, the scale operator directs the driver to a staging area to await further instructions and site manager action.

15 Landfill Inbound Procedure

The landfill inbound verification and transaction process undertaken by a respective driver is detailed by flow diagram in Figure 3, and summarized below:

20 ➤ Driver arrives at Landfill: Once directed, proceeds onto the scales. The driver presents the scale operator his/her IDcard, the load manifest and weigh tickets.

25 ➤ After verifying the driver's picture, the scale operator inserts the IDcard into the WMU (site controller).

30 ➤ The WMU reads the IDcard and determines whether the driver and hauler are in compliance with the pre-determined characteristics required by the Transportation Management entity.

35 ➤ If compliant, the WMU prompts the scale operator to enter whether the vehicle is "inbound" or "outbound". Upon entering "inbound", the WMU prompts the scale operator to enter the ID of the trailer delivered. The WMU validates trailer compliance.

40 ➤ If the trailer is compliant, the WMU verifies the trailer ID entered to the WMU is the same as the trailer ID written to the IDcard at the transfer station. The WMU also verifies whether the driver has arrived at the destination (landfill) assigned, as written to the IDcard at the transfer station.

45 ➤ If all is in order, the vehicle is weighed and data is entered to the scale equipment and software (or directly to the WMU if the scale equipment is not computerized). If data is entered to the scale software, the scale software transmits the data to the WMU. Data includes gross, net and tare weights. If the vehicle weighs more than a pre-determined limit (defined as the vehicle weight leaving the transfer station plus a differential, the differential possibly equaling 2500 pounds), the process is terminated and the site manager consulted. Until resolution by the site manager, the scale operator retains the driver's IDcard, all paper work, and directs the driver and vehicle to a designated

staging area. This process also occurs for any instance of non-compliance during the landfill verification and transaction process. The site manager has authority, through use of his site manager card communicating with the WMU, to override non-compliant credentials and authorize driver access to the landfill.

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- Upon compliance with all credentials, and/or resolution of all issues by the site manager, the WMU records the transaction data and clears the IDcard of updateable data (transfer site transaction data). The scale operator instructs the driver to unload.

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The waste management method and system of the present invention is instrumental in preventing problems directed to overweight loads, unqualified drivers and improper routing of deliveries. Trailers are recorded as leaving a transfer station within state regulated highway load limits. Drivers are prevented from delivering loads (both type and quantity) to a landfill other than the load assigned at the transfer station. Drivers are prevented from traversing routes other than the most direct, efficient route between transfer station and assigned landfill. Unqualified haulers, drivers and trailers are prevented from operating on the roadways.

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The problems prevented by the present invention increase the overall operational efficiency of the transportation network, resulting in cost reductions to the transportation management entity. More deliveries per time period per hauler have resulted. Efficiencies have improved for the subcontract haulers as well, all of the above verifiable by periodic reports generated by the present invention and evaluated for improvements over time.

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These and other advantages of the present invention will be apparent to those skilled in the art from the foregoing specification. Accordingly, it will be recognized by those skilled in the art that changes or modifications may be made to the above-described embodiments without departing from the broad inventive concepts of the invention. It should therefore be understood that this invention is not limited to the particular

embodiments described herein, but is intended to include all changes and modifications that are within the scope and spirit of the invention.